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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. 10/585,497 | Applicant(s) MONRO, DONALD M. |
|---|---|---|
| | Examiner Nirav G. Patel | Art Unit 2624 |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *06 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-63* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10-12,15-23,25-38 and 40-63* is/are rejected.

7)☒ Claim(s) *9,13,14,24 and 39* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 March 2009* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/25/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

**DETAILED ACTION**

It would be of great assistance to the Office if all incoming papers pertaining to a filed application carried the following items:

1. Application number (checked for accuracy, including series code and serial no.).
2. Group art unit number (copied from most recent Office communication).
3. Filing date.
4. Name of the examiner who prepared the most recent Office action.
5. Title of invention.
6. Confirmation number (See MPEP § 503).

***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

***Information Disclosure Statement***

2. The information disclosure statement filed 9/25/2006 complies with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609. It has been placed in the application file, and the information referred to therein has been considered as to the merits.

***Claim Rejections - 35 USC § 102***

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1 through 8, 11, 12, 15, 21 through 23, 25 through 33, 36, 37, 38, 40 through 48, and 56 through 59 are rejected under 35 U.S.C. 102(b) as being anticipated by Banham et al. ("*A Selective Update Approach to Matching Pursuits Video Coding*," "Banham" as cited in IDS).

**1) Regarding Claim 1**, Banham teaches a method of data compression comprising applying a transform to multi-dimensional data to generate a multi-dimensional transform data set (Page 121, Col. 1, Lines 30-31: A 2-D decomposition is performed on video data, which generates a multi-dimensional data set (2-D – two dimensions)), and

coding the transform data set by applying one or more one-dimensional matching pursuits algorithms (Page 119, Col. 1, Lines 8-10: Matching pursuits (one-dimensional) is the approach used to code the video, which has been transformed using a discrete cosine transform (DCT) (transform data). Page 119, Col. 2, Lines 15-18: The DCT blocks are equally sized coefficients describing the two-dimensional spatial frequency spectrum).

**2) Regarding Claim 2**, Banham teaches a method of data compression comprising:

(a) applying a transform to multi-dimensional data to generate a multi-dimensional transform data set (Page 121, Col. 1, Lines 30-31: A 2-D decomposition is performed on video data, which generates a multi-dimensional data set (2-D – two dimensions));

(b) convolving the transform data set with each of a plurality of first one-dimensional basis functions to generate a corresponding plurality of convolved data sets (Page 121, Col. 2, Lines: 27-37: 1-D convolution is performed on the data set using three independent parameters in _each_ (plurality) basis function which produces a plurality of convolved data sets);

(c) determining a location in a first direction across all the convolved data sets, and a first basis function, representative of a greatest magnitude (Pages 122, Col. 1, Lines 2-8: The matching pursuits algorithm finds the best match within the dictionary (location across all the convolved data sets of the dictionary) which is the largest projection coefficient (greatest magnitude));

(d) representing part of the transform data surrounding the said location with an atom derived from the first and second basis functions corresponding to the greatest determined magnitudes (Page 122, Col. 1, Lines 6-8: The dictionary (dictionary contains first and second basis functions) is searched for a best match, which is an atom with the largest projection coefficient (greatest determined magnitude));

(e) subtracting the atom from the transform data set to create a new data set (Page 122, Col. 1, Lines 9-10: The projection onto this atom is subtracted from the current residual to generate a new signal (data set));

(f) repeatedly updating the convolved data sets by convolving any changed part of the transform data set with each of the plurality of first one-dimensional basis functions, and then re-applying steps (c) and (d) (Page 122, Col. 1, Lines 11-12: The new signal (changed part of the transform data) becomes the current residual and the steps are repeated with each of the plurality of one-dimensional basis functions (Table 1)); and

(g) outputting as transform data coded versions of the atoms derived at step (d) (Page 122, Col. 1, Lines 11-12: The steps are repeated until termination, which outputs a new residual signal (coded versions of atoms)).

**3) Regarding Claim 3**, Banham teaches a method of data compression as claimed in claim 2 in which the coded version of each atom includes magnitude, position

in transform data set and number of basis function (Page 122, Table 1: The coded version of the atom includes number of basis function, magnitude, and position in transform data set).

**4) Regarding Claim 4**, Banham teaches a method of data compression as claimed in claim 1 in which the data to be compressed represents video image data (Page 119, Col. 1, Lines 1-5: The paper address an approach to video coding).

**5) Regarding Claim 5**, Banham teaches a method of data compression as claimed in claim 1 in which the data to be compressed represents a still image (Page 119, Col. 1, Lines 1-5: Matching pursuits (MP) is used in combination with a new algorithm for coding each frame (still image) in a sequence).

**6) Regarding Claim 6**, Banham teaches a method of data compression as claimed in claim 1 in which the data to be compressed comprises residual images within a motion compensated video coder (Page 123, Col. 2, Lines 30-35: The position of the atoms is encoded (compressed) using differential coding).

**7) Regarding Claim 7**, Banham teaches a method of data compression as claimed in claim 1 in which one dimension of the transform data set represents time (Figures 1&2: The transform data has one dimension equal to time).

**8) Regarding Claim 8**, Banham teaches a method of data compression as claimed in claim 1 in which the transform is a frequency-separating transform (Figure 1&2: The transforms separate frequency over time).

**9) Regarding Claim 11**, Banham teaches a method of data compression as claimed in claim 1 in which the algorithms are applied by sequential one-dimensional

scans through the data (Page 123, Col. 1, Lines 8-10: 1-D convolutions is performed in multiple directions over the region of interest (data)).

**10) Regarding Claim 12**, Banham teaches a method of data compression as claimed in claim 11 in which the scans successively switch between directions within the data (Page 123, Col. 1, Lines 8-10: 1-D convolutions is performed in the horizontal and vertical direction over the region of interest (data)).

**11) Regarding Claim 15**, Banham teaches a method as claimed in claim 2 including applying a function map to the convolved data sets before determining the location of greatest magnitude (Page 122, Col. 2, Lines 1-27: The steps of the method includes computing an energy map (function map) which is then processed results in the parameters being weighted, and then determining the location of the greatest magnitude).

**12) Regarding Claim 21**, Banham teaches a method as claimed in claim 2 in which the second one-dimensional basis functions extend in the spatial domain (Page 122, Col. 2, Lines 11-14: The sum of the absolute values (SOAV) is calculated at each block of the image (spatial), which is in the spatial domain).

**13) Regarding Claim 22**, Banham teaches a method as claimed in claim 2 in which the second one-dimensional basis functions extend in the time domain (Figure 1&2: The one-dimensional basis function extends in the time domain (x axis)).

**14) Regarding Claim 23,** Banham teaches a method as claimed in claim 2, including the additional steps of:(a) convolving the transform data at the said location with each of a plurality of third one-dimensional basis functions (Page 121, Col. 2, Lines: 27-37: 1-D convolution is performed on the data set using three independent parameters in *each* (plurality,

third, as the steps are repeated until termination (Page 122, Col. 1, Lines 11-12)) basis function which produces a plurality of convolved data sets); and

(b) determining a third basis function of a greatest magnitude; and in which the atom is further derived from the third basis function corresponding to the greatest determined magnitude (Pages 122, Col. 1, Lines 2-8: The matching pursuits algorithm finds the best match within the dictionary (location across all the convolved data sets of the dictionary, third basis function of the plurality) which is the largest projection coefficient (greatest magnitude)).

**15) Regarding Claim 25**, Banham teaches a method as claimed in claim 2, in which the second basis function representative of the greatest magnitude is determined at least partly by searching a local area in the region of the said location (Page 123, Col. 1, Lines 3-11: The best atom is found by computing inner products of every pixel in 16 x 16 region (local area) and the largest energy (greatest magnitude) is selected as the best atom).

**16) Regarding Claim 26**, Banham teaches a method of data compression comprising:

(a) applying a transform to multi-dimensional data to generate a multi-dimensional transform data set (Page 121, Col. 1, Lines 30-31: A 2-D decomposition is performed on video data, which generates a multi-dimensional data set (2-D – two dimensions));

(b) convolving the transform data set with each of a plurality of first one-dimensional basis functions to generate a corresponding plurality of convolved data sets (Page 121, Col. 2, Lines: 27-37: 1-D convolution is performed on the data set using three independent parameters in *each* (plurality) basis function which produces a plurality of convolved data sets);

(c) determining a first location in a first direction across all the convolved data sets, and a first basis function representative of a greatest magnitude (Pages 122, Col. 1,

Lines 2-8: The matching pursuits algorithm finds the best match within the dictionary (location across all the convolved data sets of the dictionary) which is the largest projection coefficient (greatest magnitude)); and representing part of the transform data surrounding the first location with a first atom derived from the first function corresponding to the greatest determined magnitude (Page 122, Col. 1, Lines 6-8: The dictionary (dictionary contains first and second basis functions) is searched for a best match, which is an atom with the largest projection coefficient (greatest determined magnitude));

(d) subtracting the first atom from the transform data set to create a new data set (Page 122, Col. 1, Lines 9-10: The projection onto this atom is subtracted from the current residual to generate a new signal (data set));

*Note: The following three steps is another iteration of the same method taught by Banham, who also teaches that the steps will be repeated until termination (Page 122, Col. 1, Lines 11-12), which teaches the following steps (e-g). For the purposes of this action, all iterations will be considered as taught by Banham.*

(e) convolving the new data set with each of a plurality of second one-dimensional basis functions (Page 121, Col. 2, Lines: 27-37: 1-D convolution is performed on the data set using three independent parameters in _each_ (plurality) basis function which produces a plurality of convolved data sets);

(f) determining a second location in a second direction across all the convolved data sets, and a second basis function representative of a greatest magnitude (Pages 122, Col. 1, Lines 2-8: The matching pursuits algorithm finds the best match within the dictionary (location across all the convolved data sets of the dictionary) which is the largest projection coefficient (greatest magnitude)); and representing part of the new data set surrounding a second location with a second atom derived from the second function corresponding to the greatest

determined magnitude (Page 122, Col. 1, Lines 6-8: The dictionary (dictionary contains first and second basis functions) is searched for a best match, which is an atom with the largest projection coefficient (greatest determined magnitude));

(g) subtracting the second atom from the new data set to create a further new data set (Page 122, Col. 1, Lines 9-10: The projection onto this atom is subtracted from the current residual to generate a new signal (data set));

(h) repeating step (b) with the further new data set, and then re-applying steps (c) to (f) (Page 122, Col. 1, Lines 11-12: The new signal (changed part of the transform data) becomes the current residual and the steps are repeated with each of the plurality of one-dimensional basis functions (Table 1)); and

(i) outputting as quantized transform data coded versions of the atoms derived at steps (c) and (f) (Page 122, Col. 1, Lines 11-12: The steps are repeated until termination, which outputs a new residual signal (coded versions of atoms)).

**17) Regarding Claim 27**, Banham teaches a method of data compression as claimed in claim 26 in which the first location and the second location are coincident (Page 119, Col. 1, Lines 1-5: Matching pursuits (MP) is used in combination with a new algorithm for coding each frame (still image) in a sequence, where the locations are within the same image).

**18) Regarding Claim 28**, Banham teaches a coder for data compression (Page 119, Col. 1, Lines 21-23: a codec, which is software which when executed by a system, performs encoding/decoding and acts as an encoder/decoder) comprising means for applying a transform to time-varying data to generate a multi-dimensional transform data set (Page 121, Col. 1, Lines 30-31: A 2-D decomposition is performed on video data (time-varying data), which generates a multi-dimensional data set (2-D – two dimensions)), and a coder for coding the transform data

set by applying a plurality of one-dimensional matching pursuits algorithms, one for each dimension (Page 119, Col. 1, Lines 8-10: Matching pursuits (one-dimensional) is the approach used to code the video, which has been transformed using a discrete cosine transform (DCT) (transform data). Page 119, Col. 2, Lines 15-18: The DCT blocks are equally sized coefficients describing the two-dimensional spatial frequency spectrum).

**19) Regarding Claim 29**, a coder for data compression (Page 119, Col. 1, Lines 21-23: a codec, which is software which when executed by a system, performs encoding/decoding and acts as an encoder/decoder) comprising: (a) means for applying a transform to multi-dimensional data to generate a multi-dimensional transform data set (Page 121, Col. 1, Lines 30-31: A 2-D decomposition is performed on video data, which generates a multi-dimensional data set (2-D – two dimensions)),

(b) means for convolving the transform data set with each of a plurality of first one-dimensional basis functions to generate a corresponding plurality of convolved data sets (Page 121, Col. 2, Lines: 27-37: 1-D convolution is performed on the data set using three independent parameters in *each* (plurality) basis function which produces a plurality of convolved data sets);

(c) means for determining a location in a first direction across all the convolved data sets, and a first basis function representative of a greatest magnitude (Pages 122, Col. 1, Lines 2-8: The matching pursuits algorithm finds the best match within the dictionary (location across all the convolved data sets of the dictionary) which is the largest projection coefficient (greatest magnitude));

(d) means for representing part of the transform data surrounding the said location with an atom derived from the first function corresponding to the greatest

determined magnitudes (Page 122, Col. 1, Lines 6-8: The dictionary (dictionary contains first and second basis functions) is searched for a best match, which is an atom with the largest projection coefficient (greatest determined magnitude));

(e) means for subtracting the atom from the transform data set to create a new data set (Page 122, Col. 1, Lines 9-10: The projection onto this atom is subtracted from the current residual to generate a new signal (data set));

(f) means for repeatedly updating the convolved data sets by convolving any changed part of the transform data set with each of the plurality of first one-dimensional basis functions (Page 122, Col. 1, Lines 11-12: The new signal (changed part of the transform data) becomes the current residual and the steps are repeated with each of the plurality of one-dimensional basis functions (Table 1)); and

(g) means for outputting as transform data coded versions of the derived atoms (Page 122, Col. 1, Lines 11-12: The steps are repeated until termination, which outputs a new residual signal (coded versions of atoms)).

**20) Regarding Claim 30**, Banham teaches a coder for data compression as claimed in Claim 29 including: (c1) means for convolving the transform data at the said location with each of a plurality of second one-dimensional basis functions (Page 121, Col. 2, Lines: 27-37: 1-D convolution is performed on the data set using three independent parameters in *each* (plurality) basis function which produces a plurality of convolved data sets); and

(c2) means for determining a second basis function representative of a greatest magnitude; and in which the means for representing part of the transform data further operates upon the second basis functions (Pages 122, Col. 1, Lines 2-8: The matching pursuits

algorithm finds the best match within the dictionary (location across all the convolved data sets of the dictionary) which is the largest projection coefficient (greatest magnitude)).

**21) Regarding Claim 31**, Banham teaches a coder for data compression (Page 119, Col. 1, Lines 21-23: a codec, which is software which when executed by a system, performs encoding/decoding and acts as an encoder/decoder) comprising:

(a) means for applying a transform to multi-dimensional data to generate a multi-dimensional transform data set (Page 121, Col. 1, Lines 30-31: A 2-D decomposition is performed on video data, which generates a multi-dimensional data set (2-D – two dimensions));

(b) means for convolving the transform data set with each of a plurality of first one-dimensional basis functions to generate a corresponding plurality of convolved data sets (Page 121, Col. 2, Lines: 27-37: 1-D convolution is performed on the data set using three independent parameters in *each* (plurality) basis function which produces a plurality of convolved data sets);

(c) means for determining a first location in a first direction across all the convolved data sets, and a first basis function representative of a greatest magnitude (Pages 122, Col. 1, Lines 2-8: The matching pursuits algorithm finds the best match within the dictionary (location across all the convolved data sets of the dictionary) which is the largest projection coefficient (greatest magnitude)); and

representing part of the transform data surrounding the first location with a first atom derived from the first function corresponding to the greatest determined magnitude (Page 122, Col. 1, Lines 6-8: The dictionary (dictionary contains first and second basis functions) is searched for a best match, which is an atom with the largest projection coefficient (greatest determined magnitude)).

**22) Regarding Claim 32**, Banham teaches a coder for data compression (Page 119, Col. 1, Lines 21-23: a codec, which is software which when executed by a system, performs encoding/decoding and acts as an encoder/decoder) comprising:

(a) means for applying a transform to multi-dimensional data to generate a multi-dimensional transform data set (Page 121, Col. 1, Lines 30-31: A 2-D decomposition is performed on video data, which generates a multi-dimensional data set (2-D – two dimensions));

(b) means for convolving the transform data set with each of a plurality of first one-dimensional basis functions to generate a corresponding plurality of convolved data sets (Page 121, Col. 2, Lines: 27-37: 1-D convolution is performed on the data set using three independent parameters in _each_ (plurality) basis function which produces a plurality of convolved data sets);

(c) means for determining a first location in a first direction across all the convolved data sets, and a first basis function representative of a greatest magnitude (Pages 122, Col. 1, Lines 2-8: The matching pursuits algorithm finds the best match within the dictionary (location across all the convolved data sets of the dictionary) which is the largest projection coefficient (greatest magnitude)); and representing part of the transform data surrounding the first location with a first atom derived from the first function corresponding to the greatest determined magnitude (Page 122, Col. 1, Lines 6-8: The dictionary (dictionary contains first and second basis functions) is searched for a best match, which is an atom with the largest projection coefficient (greatest determined magnitude));

(d) means for subtracting the first atom from the transform data set to create a new data set (Page 122, Col. 1, Lines 9-10: The projection onto this atom is subtracted from the current residual to generate a new signal (data set));

(e) means for convolving the new data set with each of a plurality of second one-dimensional basis functions (Page 122, Col. 1, Lines 11-12: The new signal (changed part of the transform data) becomes the current residual and the steps are repeated with each of the plurality of one-dimensional basis functions (Table 1));

(f) means for determining a second location in a second direction across all the convolved data sets, and a second basis function representative of a greatest magnitude (Pages 122, Col. 1, Lines 2-8: The matching pursuits algorithm finds the best match within the dictionary (location across all the convolved data sets of the dictionary) which is the largest projection coefficient (greatest magnitude)); and representing part of the new data set surrounding a second location with a second atom derived from the second function corresponding to the greatest determined magnitude (Page 122, Col. 1, Lines 6-8: The dictionary (dictionary contains first and second basis functions) is searched for a best match, which is an atom with the largest projection coefficient (greatest determined magnitude));

(g) means for subtracting the second atom from the new data set to create a further new data set (Page 122, Col. 1, Lines 9-10: The projection onto this atom is subtracted from the current residual to generate a new signal (data set));

(h) means for repeating step (b) with the further new data set, and then re-applying steps (c) to (f) (Page 122, Col. 1, Lines 11-12: The new signal (changed part of the transform data) becomes the current residual and the steps are repeated with each of the plurality of one-dimensional basis functions (Table 1)); and

(i) means for outputting as transform data coded versions of the atoms derived at steps (c) and (f) (Page 122, Col. 1, Lines 11-12: The steps are repeated until termination, which outputs a new residual signal (coded versions of atoms)).

**23) Regarding Claim 33,** Banham teaches a codec including a coder as claimed in claim 28 (Page 119, Col. 1, Lines 21-23: A hybrid video codec is based on the concept (method)).

**24) Regarding Claim 36**, Banham teaches a method as claimed in Claim 2 including the further steps of: (c1) convolving the transform data at the said location with each of a plurality of second one-dimensional basis functions (Page 121, Col. 2, Lines: 27-37: 1-D convolution is performed on the data set using three independent parameters in *each* (plurality) basis function which produces a plurality of convolved data sets);

(c2) determining a second basis function representative of a greatest magnitude; and including, at step (d), representing part of the transform data surrounding the said location with an atom derived both from the first and from the second basis functions corresponding to the greatest determined magnitudes (Pages 122, Col. 1, Lines 2-8: The matching pursuits algorithm finds the best match within the dictionary (location across all the convolved data sets of the dictionary) which is the largest projection coefficient (greatest magnitude)).

**25) Regarding Claim 37**, Banham teaches a method of data compression as claimed in claim 11 in which the sequential one-dimensional scans through the data are orthogonal (Page 119, Col. 1, Lines 18-23: A combination of orthogonal and nonorthogonal transforms are used for encoding).

**26) Regarding Claim 38**, Banham teaches a method of data compression as claimed in claim 2 in which the data to be compressed represents video image data (Page 119, Col. 1, Lines 1-5: The paper address an approach to video coding).

**27) Regarding Claim 40**, Banham teaches a method of data compression as claimed in claim 3 in which the data to be compressed represents video image data (Page 119, Col. 1, Lines 1-5: The paper address an approach to video coding).

**28) Regarding Claim 41**, Banham teaches a method of data compression as claimed in claim 2 in which the data to be compressed represents a still image (Page 119, Col. 1, Lines 1-5: Matching pursuits (MP) is used in combination with a new algorithm for coding each frame (still image) in a sequence).

**29) Regarding Claim 42**, Banham teaches a method of data compression as claimed in claim 3 in which the data to be compressed represents a still image (Page 119, Col. 1, Lines 1-5: Matching pursuits (MP) is used in combination with a new algorithm for coding each frame (still image) in a sequence).

**30) Regarding Claim 43**, Banham teaches a method of data compression as claimed claim 2 in which the data to be compressed comprises residual images within a motion compensated video coder (Page 123, Col. 2, Lines 30-35: The position of the atoms is encoded (compressed) using differential coding).

**31) Regarding Claim 44**, Banham teaches a method of data compression as claimed claim 3 in which the data to be compressed comprises residual images within a motion compensated video coder (Page 123, Col. 2, Lines 30-35: The position of the atoms is encoded (compressed) using differential coding).

**32) Regarding Claim 45**, Banham teaches a method of data compression as claimed in claim 2 in which one dimension of the transform data set represents time (Figures 1&2: The transform data has one dimension equal to time).

**33) Regarding Claim 46**, Banham teaches a method of data compression as claimed in claim 3 in which one dimension of the transform data set represents time(Figures 1&2: The transform data has one dimension equal to time).

**34) Regarding Claim 47**, Banham teaches a method of data compression as claimed in claim 2 in which the transform is a frequency-separating transform (Figure 1&2: The transforms separate frequency over time).

**35) Regarding Claim 48**, Banham teaches a method of data compression as claimed in claim 3 in which the transform is a frequency-separating transform (Figure 1&2: The transforms separate frequency over time).

**36) Regarding Claim 56**, Banham teaches a codec including a coder as claimed in claim 29 (Page 119, Col. 1, Lines 21-23: A hybrid video codec is based on the concept (method)).

**37) Regarding Claim 57**, Banham teaches a codec including a coder as claimed in claim 30 (Page 119, Col. 1, Lines 21-23: A hybrid video codec is based on the concept (method)).

**38) Regarding Claim 58**, Banham teaches a codec including a coder as claimed in claim 31 (Page 119, Col. 1, Lines 21-23: A hybrid video codec is based on the concept (method)).

**39) Regarding Claim 59**, Banham teaches a codec including a coder as claimed in claim 32 (Page 119, Col. 1, Lines 21-23: A hybrid video codec is based on the concept (method)).

## ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Banham in view of Dhavala et al. (U.S. Pub. No.: 2003/0228068, "Dhavala").

**1) Regarding Claim 10**, while Banham teaches the limitations of claim 1, he fails to teach the limitations of claim 10.

However, in the same field of endeavor, Dhavala teaches a method of data compression as claimed in claim 1 in which the transform is two-dimensional (Abstract: A Modified Hadamard transform (two-dimensional transform) is used to decompose image data).

Using a Modified Hadamard Transform achieves a high level of compression along with robustness and avoiding loss or corruption of data due to channel errors.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Dhavala to Banham.

6. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Banham in view of Kawahara (U.S. Pat. No.: 6,393,393).

**1) Regarding Claim 16**, while Banham teaches the limitations of claim 15, he fails to teach the limitations of claim 16.

However, in the same field of endeavor, Kawahara teaches function maps represent a sensory model (Figure 13: A normal psychoacoustic model unit is used, the psychoacoustic model representing a sensory model).

Allowing the function map to represent a sensory model allows for a high quality signal compression due to the fact that the model describes which parts of the signal can be removed without significant loss of data, thus achieving higher compression in the signal, saving memory and bandwidth by its use.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Kawahara to Banham.

**2) Regarding Claim 17**, while Banham teaches the limitations of claim 15, he fails to teach the limitations of claim 17.

However, in the same field of endeavor, Kawahara teaches where the function map represents a psychoacoustic model (Figure 13: A normal psychoacoustic model unit is used for low-band encoding).

Allowing the function map to represent a psychoacoustic model allows for a high quality signal compression due to the fact that the model describes which parts of the sound signal can be removed without significant loss of data, as perceived by a user, thus achieving higher compression in the audio signal, saving memory and bandwidth by its use.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Kawahara to Banham.

7. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Banham in view of Bordes et al. (U.S. Pat. No.: 6,535,555, "Bordes").

**1) Regarding Claim 18**, while Banham teaches the limitations of claim 15, he fails to teach the limitations of claim 18.

However, in the same field of endeavor, Bordes teaches where the function map represents a psychovisual model (Col. 2, Lines 36-40: The criterion for improving an image is provided by a psychovisual model).

Allowing the function map to represent a psychovisual model allows for a high quality signal compression due to the fact that the model describes which parts of the video signal can be removed without significant loss of data, as perceived by a user, thus achieving higher compression in the video signal, saving memory and bandwidth by its use.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Bordes to Banham.

8. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Banham in view of Tian et al. (U.S. Pub. No.: 2003/0179901, "Tian").

**1) Regarding Claim 19**, while Banham teaches the limitations of claim 15, he fails to teach the limitations of claim 19.

However, in the same field of endeavor, Tian teaches where the function map is multiplicatively applied (Paragraph 29: The mask data is applied to a watermark by multiplication (multiplicatively)).

Applying the map multiplicatively allows for a way of manipulating the data pixel-by-pixel, which eliminates the need of having an intermediate buffer to store the data while the computation of the entire image is done, thereby eliminating a bottleneck effect (due to the vast amount of data in the buffer, slowing it down). The pixel-by-pixel is done on-the-fly which is quicker and eliminates the need of a buffer.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Tian to Banham.

9. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Banham in view of Yang et al. (U.S. Pat. No.: 5,648,987, "Yang").

**1) Regarding Claim 20**, while Banham teaches the limitations of claim 15, he fails to teach the limitations of claim 20.

However, in the same field of endeavor, Yang teaches subtractively applying (combining) data with another set of data (Claim 12: A digital subtractor is used to subtractively combine digital samples).

Applying the map subtractively allows for generating difference data due to the fact that the original data and then map data are subtracted from each other. The difference data has less data than the original data, thus saving memory and bandwidth to process and store the data, which can be easily reconstructed using well known methods.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Yang to Banham.

10. Claims 34, 35 and 60 through 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Banham in view of Boon et al. (U.S. Pub. No.: 2005/0163216, "Boon").

**1) Regarding Claim 34**, while Banham teaches the limitations of claim 1, he fails to teach the limitations of claim 34.

However, in the same field of endeavor, Boon teaches a computer program for carrying out a method as claimed claim 1 (Paragraph 10: The image encoding method is provided as a computer program product).

Carrying out a method on a computer program allows for a way to automate the method such that a computer will perform the steps, making the method faster and efficient due to the fact that an individual will not be performing each step manually.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Boon to Banham.

**2) Regarding Claim 35**, while Banham teaches the limitations of claim 1, he fails to teach the limitations of claim 35.

However, in the same field of endeavor, Boon teaches a machine-readable data carrier carrying a computer program as claimed in claim 34 (Paragraph 10: The image encoding method is provided as a computer-readable (machine-readable) medium).

Carrying out a method on a machine-readable data carrier allows for a way to automate the method such that a computer will perform the steps, making the method faster and efficient due to the fact that an individual will not be performing each step manually.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Boon to Banham.

**3) Regarding Claim 60**, while Banham teaches the limitations of claim 2, he fails to teach the limitations of claim 60.

However, in the same field of endeavor, Boon teaches a computer program for carrying out a method as claimed in claim 2 (Paragraph 10: The image encoding method is provided as a computer program product).

Carrying out a method on a computer program allows for a way to automate the method such that a computer will perform the steps, making the method faster and efficient due to the fact that an individual will not be performing each step manually.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Boon to Banham.

**4) Regarding Claim 61**, while Banham teaches the limitations of claim 2, he fails to teach the limitations of claim 61.

However, in the same field of endeavor, Boon teaches a machine-readable data carrier carrying a computer program as claimed in claim 60 (Paragraph 10: The image encoding method is provided as a computer-readable (machine-readable) medium).

Carrying out a method on a machine-readable data carrier allows for a way to automate the method such that a computer will perform the steps, making the method faster and efficient due to the fact that an individual will not be performing each step manually.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Boon to Banham.

**5) Regarding Claim 62**, while Banham teaches the limitations of claim 26, he fails to teach the limitations of claim 62.

However, in the same field of endeavor, Boon teaches a computer program for carrying out a method as claimed in claim 26 (Paragraph 10: The image encoding method is provided as a computer program product).

Carrying out a method on a computer program allows for a way to automate the method such that a computer will perform the steps, making the method faster and efficient due to the fact that an individual will not be performing each step manually.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Boon to Banham.

**6) Regarding Claim 63**, while Banham teaches the limitations of claim 26, he fails to teach the limitations of claim 63.

However, in the same field of endeavor, Boon teaches a machine-readable data carrier carrying a computer program as claimed in claim 62 (Paragraph 10: The image encoding method is provided as a computer-readable (machine-readable) medium).

Carrying out a method on a machine-readable data carrier allows for a way to automate the method such that a computer will perform the steps, making the method faster and efficient due to the fact that an individual will not be performing each step manually.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Boon to Banham.

11. Claims 49 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Banham in view of Kawahara and in further view of Tian.

**1) Regarding Claim 49,** while Banham and Kawahara teach in combination the limitations of claim 16, they fail to teach the limitations of claim 50.

However, in the same field of endeavor, Tian teaches where the function map is multiplicatively applied (Paragraph 29: The mask data is applied to a watermark by multiplication (multiplicatively)).

Applying the map multiplicatively allows for a way of manipulating the data pixel-by-pixel, which eliminates the need of having an intermediate buffer to store the data while the computation of the entire image is done, thereby eliminating a bottleneck effect (due to the vast amount of data in the buffer, slowing it down). The pixel-by-pixel is done on-the-fly which is quicker and eliminates the need of a buffer.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Tian to Kawahara and Banham.

**2) Regarding Claim 50**, while Banham and Kawahara teach in combination the limitations of claim 17, they fail to teach the limitations of claim 50.

However, in the same field of endeavor, Tian teaches where the function map is multiplicatively applied (Paragraph 29: The mask data is applied to a watermark by multiplication (multiplicatively)).

Applying the map multiplicatively allows for a way of manipulating the data pixel-by-pixel, which eliminates the need of having an intermediate buffer to store the data while the computation of the entire image is done, thereby eliminating a bottleneck effect (due to the vast amount of data in the buffer, slowing it down). The pixel-by-pixel is done on-the-fly which is quicker and eliminates the need of a buffer.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Tian to Kawahara and Banham.

12. Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over Banham in view of Bordes and in further view of Tian.

**1) Regarding Claim 51**, while Banham and Bordes teach in combination the limitations of claim 18, they fail to teach the limitations of claim 51.

However, in the same field of endeavor, Tian teaches a method as claimed in claim 18 in which the function map is multiplicatively applied (Paragraph 29: The mask data is applied to a watermark by multiplication (multiplicatively)).

Applying the map multiplicatively allows for a way of manipulating the data pixel-by-pixel, which eliminates the need of having an intermediate buffer to store the data while the computation of the entire image is done, thereby eliminating a bottleneck effect (due to the vast amount of data in the buffer, slowing it down). The pixel-by-pixel is done on-the-fly which is quicker and eliminates the need of a buffer.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Tian to Bordes and Banham.

13. Claims 52 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Banham in view of Kawahara and in further view of Yang.

**1) Regarding Claim 52**, while Banham and Kawahara teach in combination the limitations of claim 16, they fail to teach the limitations of claim 52.

However, in the same field of endeavor, Yang teaches a method as claimed in claim 16 in which the function map is additively or subtractively applied (Claim 12: A digital subtractor is used to subtractively combine digital samples).

Applying the map subtractively allows for generating difference data due to the fact that the original data and then map data are subtracted from each other. The difference data has less data than the original data, thus saving memory and bandwidth to process and store the data, which can be easily reconstructed using well known methods.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Yang to Kawahara and Banham.

**2) Regarding Claim 53**, while Banham and Kawahara teach in combination the limitations of claim 17, they fail to teach the limitations of claim 53.

However, in the same field of endeavor, Yang teaches a method as claimed in claim 17 in which the function map is additively or subtractively applied (Claim 12: A digital subtractor is used to subtractively combine digital samples).

Applying the map subtractively allows for generating difference data due to the fact that the original data and then map data are subtracted from each other. The difference data has less data than the original data, thus saving memory and bandwidth to process and store the data, which can be easily reconstructed using well known methods.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Yang to Kawahara and Banham.

14. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Banham in view of Bordes and in further view of Yang.

**1) Regarding Claim 54**, while Banham and Bordes teach in combination the limitations of claim 18, they fail to teach the limitations of claim 54.

However, in the same field of endeavor, Yang teaches method as claimed in claim 18 in which the function map is additively or subtractively applied (Claim 12: A digital subtractor is used to subtractively combine digital samples).

Applying the map subtractively allows for generating difference data due to the fact that the original data and then map data are subtracted from each other. The difference data has less data than the original data, thus saving memory and bandwidth to process and store the data, which can be easily reconstructed using well known methods.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Yang to Bordes and Banham.

15. Claim 55 is rejected under 35 U.S.C. 103(a) as being unpatentable over Banham in view of Tian and in further view of Yang.

**1) Regarding Claim 55**, while Banham and Tian teach in combination the limitations of claim 19, they fail to teach the limitations of claim 55.

However, in the same field of endeavor, Yang teaches a method as claimed in claim 19 in which the function map is additively or subtractively applied (Claim 12: A digital subtractor is used to subtractively combine digital samples).

Applying the map subtractively allows for generating difference data due to the fact that the original data and then map data are subtracted from each other. The difference data has less data than the original data, thus saving memory and bandwidth to process and store the data, which can be easily reconstructed using well known methods.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Yang to Tian and Banham.

### ***Allowable Subject Matter***

16. Claims 9, 13, 14, 24 and 39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. Regarding Claims 9 and 39, the prior art fails to teach the transform decorrelates at least part of the transform data set better in one direction than in a perpendicular direction, and in which a first algorithm is applied by carrying out a one-dimensional scan in the direction of greatest correlation

18. Regarding Claim 13, the prior art fails to teach successive scans continue in the same direction until an atom is located of lower magnitude than atoms which have

previously been located in scans in other directions, and in which the scan direction is then changed.

19. Regarding Claim 14, the prior art fails to teach the scan direction is changed to that direction in which an atom of highest current magnitude as previously been located.

20. Regarding Claim 24, the prior art fails to teach the second basis function representative of the greatest magnitude is determined without further searching in the region of the said location.

## ***Conclusion***

Regarding the method claims of the current application, the steps inherently require a machine and therefore renders the claims statutory.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nirav G. Patel whose telephone number is (571)270-5812. The examiner can normally be reached on Monday - Friday 8 am - 5 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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7/30/09